The author concludes by observing, that the equations for the transmission of an undulation along a musical string require a similar correction to that introduced in the case of aërial vibrations. The discussion of this branch of the subject he reserves for a future opportunity.

May 6, 1858.

The LORD WROTTESLEY, President, in the Chair.

In accordance with the Statutes, the Secretary read the following list of Candidates recommended by the Council for Election into the Society :—

Thomas Graham Balfour, M.D.
Edward Mounier Boxer, Captain R.A.
Frederick Currey, Esq.
David Forbes, Esq.
Alfred Baring Garrod, M.D.
William Henry Harvey, M.D.
The Rev. Samuel Haughton.
Henry Hennessy, Esq.
David Livingstone, LL.D.
John Lubbock, Esq.
Henry Darwin Rogers, LL.D.
William Scovell Savory, Esq., M.B.
Warington Wilkinson Smyth, Esq.
Lieut.-Col. Andrew Scott Waugh, B.E.
Thomas Williams, M.D.

The following communications were read :—

I. "On the Influence of Heated Terrestrial Surfaces in disturbing the Atmosphere." By THOMAS HOPKINS, Esq. Communicated by WILLIAM FAIRBAIRN, Esq. Received April 13, 1858.

(Abstract.)

In this paper the author stated that the Hadleian theory of winds, which is now the one generally recognized, is not supported by the evidence of facts, but rests on assumptions founded on imaginary effects of the partial expansion of the atmospheric gases by heat. It is assumed in that theory, that when the tropical heat expands these gases, they rise and flow away laterally in the higher regions towards the poles, from which they return to the tropics in the lower regions. But it was contended by the writer of the paper, that such heating

of the gases merely expands them, without making them rise and overflow to other parts. The theory of Halley, once generally adopted, represented that the air was greatly heated in the particular part where the sun was nearly vertical, which made the air rise in that part alone, admitting cooler air to flow into the place of that which had ascended, and produced an influx of cool air below, from all parts around, to the heated part, and an overflow above from it. But in time experience showed that this hypothesis was not in accordance with facts, and it was abandoned. The theory of Hadley, which has been since adopted, substitutes the whole tropical belt, for the heated locality of Halley, which travelled with the sun in his daily course; but the supposed rise of air in the tropical belt, with an overflow above and an influx below, was asserted to be equally unsupported by experience, and, being unproved, may be fallacious. The rise of heated air in a chimney, sometimes pointed at as an illustration, was shown to be not analogous to that which takes place when the sun heats the air unequally in different latitudes; if it were, the theory of Halley would be true, and cool air would flow from all parts around to the greatly heated locality, just as cool air passes to a fire, and, when heated, up a chimney. It was then shown that it is gravitation which establishes an equilibrium of pressure in the atmosphere, and that direct solar heating of the surface of the earth and the air near to it, does not destroy that equilibrium. The sun by heating the gases merely expands them, in proportion to the increase of temperature in the part near the surface, and the gases over every portion of the hemisphere that is exposed to the action of the sun is proportionally heated, expanded and raised without any overflow of air taking place; leaving the equilibrium of pressure undisturbed by such heating. The solar heat merely raises the air that is near the surface, over the most heated latitudes, a little higher than the adjoining less heated, the difference in the rise in the various latitudes, from the polar to the tropical regions, being successively small; and as there is no alteration produced in *the weight of any vertical column* of the atmosphere, in any latitude, there is neither overflow of air above, nor disturbance of the equilibrium of pressure. The great disturbances that take place in the atmosphere were then maintained to be caused by the heat which is conveyed, from the surface of the globe, in vapour to different parts of the atmosphere

at various heights, and liberated in those parts when the vapour is condensed into liquid. This liberation of heat creates ascending currents in the parts locally affected, when horizontal winds, produced by gravitation, blow over the surface towards the ascending currents to re-establish the disturbed equilibrium. This process, by heating the air in the middle regions, was asserted to have been proved to be the cause, not only of the great trade-winds and the monsoons, but of the storms and local winds over the different regions of the globe.

II. "Notes of Researches on the Poly-Ammonias." By A. W. Hofmann, LL.D., F.R.S.—No. II. Action of Chloroform upon Aniline. Received April 15, 1858.

In a former Note addressed to the Royal Society (Proceedings, vol. ix. p. 150), I have alluded to some new alkaloids which are produced by the action of the bromides of triatomic alcohols upon the primary amidogen bases.

I have since examined more minutely one of these bodies. At the common temperature, chloroform and aniline may be left in contact for a considerable time without any change becoming perceptible. Even at the temperature of boiling water scarcely any reaction takes place. But on exposing for ten or twelve hours a mixture of about equal volumes of chloroform and aniline in sealed tubes to a temperature of 180° or 190° C., a hard brown crystalline mass is obtained, which consists chiefly of the hydrochlorates of aniline and of a new crystalline base.

To obtain this compound in a state of purity, the brown crystalline mixture formed in the digester-tubes is triturated with a small quantity of water, thrown upon a filter and washed with water. The first washings chiefly consist of hydrochlorate of aniline, which base separates in oily globules on addition of potassa to the filtrate. By testing the filtrate in this manner from time to time, it is found that the basic body separated by addition of potassa gradually exhibits a tendency to solidify, and ultimately falls as a yellowish-white crystalline precipitate. The residue upon the filter is now dissolved in warm (not boiling) water, separated by a filter from a brown resinous insoluble substance, and precipitated by ammonia or potassa. The crystalline precipitate obtained in this manner is washed till free from